IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Applicant	:	NAHRWOLD, Thomas
Appl. No.	:	09/888,478
Filed	:	June 26, 2001
Title	:	LUBICANT COOLING SYSTEM FOR A MOTOR VEHICLE AXLE
Group A. U.	:	3682
Examiner	:	KIM, C.
Docket No.	:	08200.461

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APPELLANT'S BRIEF UNDER 37 C.F.R. § 1.192

December 22, 2003

Hon. Director of Patents
and Trademarks
Washington, D.C. 20231

Dear Sir:

In follow-up to the Notice of Appeal filed October 21, 2003, Appellant respectfully requests the Board of Patent Appeals and Interferences consider the following arguments and reverse the decision of the Examiner in whole.

(1) Real Party in Interest

The real party in interest is Torque Traction Technologies, Inc., assignee to the instant invention, whose name was changed to Spicer Technology, Inc.

(2) Related Appeals and Interferences

There are no known related appeals or interferences, which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal.

(3) STATUS OF CLAIMS

1. Claims 1-20 were originally filed with the specification on June 26, 2001.

2. In the Official Action dated September 30, 2002, the Examiner rejected claims 7 and 8 under 35 U.S.C. 112 second paragraph for containing indefinite language. In addition, claims 1, 3-5, 9-15, 19 and 20 were rejected under 35 U.S.C. 102(b) as being anticipated by Baedke (USP 5,316,106), and claims 16-18 were rejected under 35 U.S.C. 103(a) as being unpatentable over Baedke '106 in view of Gabelli '748.

3. On December 30, 2002 Appellant filed an Amendment amending claims 1, 7 and 8, and presenting arguments for the patentability of claims 1 and 3-20.

4. A Notice of Abandonment was mailed May 06, 2003 because Applicant's amendment was never received by the US PTO.

5. On May 14, 2003, Applicant filed a Petition to Revive with a copy of the December 30, 2002 Amendment along with a date-stamped post card evidencing receipt of the Amendment by the US PTO. Applicant's petition was granted.

4. In the Final Official Action dated July 21, 2003, the Examiner rejected claims 1, 3-5, 9-15, 19 and 20 under 35 U.S.C. 102(b) as being anticipated by Baedke (USP 5,316,106) and rejected claims 6-8 and 16-18 under 35 U.S.C. 103(a) as being unpatentable over Baedke '106 in view of Gabelli '748.

5. On September 22, 2003, Appellant filed Amendment and Request for Reconsideration amending claim 11 and presenting arguments for the patentability of claims 1, 2-14 and 16-20.

6. On October 29, 2003 the Examiner issued an Advisory Action affirming the previous rejection and refusing to enter the Amendment dated September 22, 2003.

7. On October 21, 2003, Appellant filed a Notice of Appeal.

(4) STATUS OF AMENDMENT

The Amendment and Request for Reconsideration filed on September 22, 2003 was not entered by the Examiner. Appellant then filed a Notice of Appeal on October 21, 2003.

Subsequently, there have been no other papers filed by the Appellant or issued by the U.S. PTO.

(5) SUMMARY OF THE INVENTION

The present invention is a system that cools axle lubricant 60 in an axle housing 12 by using an oil cooler 100 that is disposed on an external surface of one axle tube 17. The present invention uses inherent pumping action of the ring gear 42 or other impeller rotating through a lubricant reservoir within the differential housing 12 to move lubricant 60 from the reservoir to a exit chamber 66 located at an elevation relatively high on the differential housing 12. Axle lubricant 100 is gravity fed through conduit 72 from the cover 26 to the external cooler 100 mounted on the axle tube 17 that surround the axle shaft 20. The conduits 72, 78 are connected by hydraulic fittings to the external cooler 100, through which the lubricant flows inboard and returns to the reservoir at the lower opening 79 of the differential housing. The oil cooler 100 is preferably a frame-mount oil cooler placed on the upper rear section of the axle tube 17.

The axle carrier assembly 12 includes laterally directed tubular extensions 44, 46 (called "trunnions") which receive the ends of housing tubes 16 and 17, respectively. Located within the axle assembly 12 is a differential carrier 48, on which bevel pinion gears 50, 52 are supported for rotation on a differential pinion shaft 54. Side bevel gears 56, 58 are in continuous meshing engagement with pinions 50, 52 and are driveably connected to left and right axle shafts 20, located respectively within tubes 16 and 17.

FIG. 3 shows ring gear 42, supported rotatably in the axle assembly housing 12, and cover 26, which closes the axle housing. The space enclosed by cover 26 and housing 12 contains a reservoir of hydraulic lubricant 60, whose upper lever 62 is high enough so that ring gear 42 rotates partially in the lubricant. The ring gear rotates clockwise as seen in FIG. 3

partially through the space within the axle assembly that is occupied by the lubricant and partially within the space above the lubricant.

Cover 26 includes an aperture 64 that opens the housing interior into a chamber or oil scrapper/pump outlet 66 adapted to hold lubricant 70 that passes through the aperture from the interior of the axle housing. Chamber 66 is bounded by an outer wall 68 and inner wall formed integrally with other portions of cover 26. As ring gear 42 rotates the beveled teeth of the gear, or slingers fixed to the lateral surface of the gear, carry lubricant from the reservoir 60 and throw it against the inner surface of cover 26 above aperture 64, through which it passes into chamber 66.

Figure 4 is shown below with textual labels added by Applicant to reference the major components of the claimed invention.

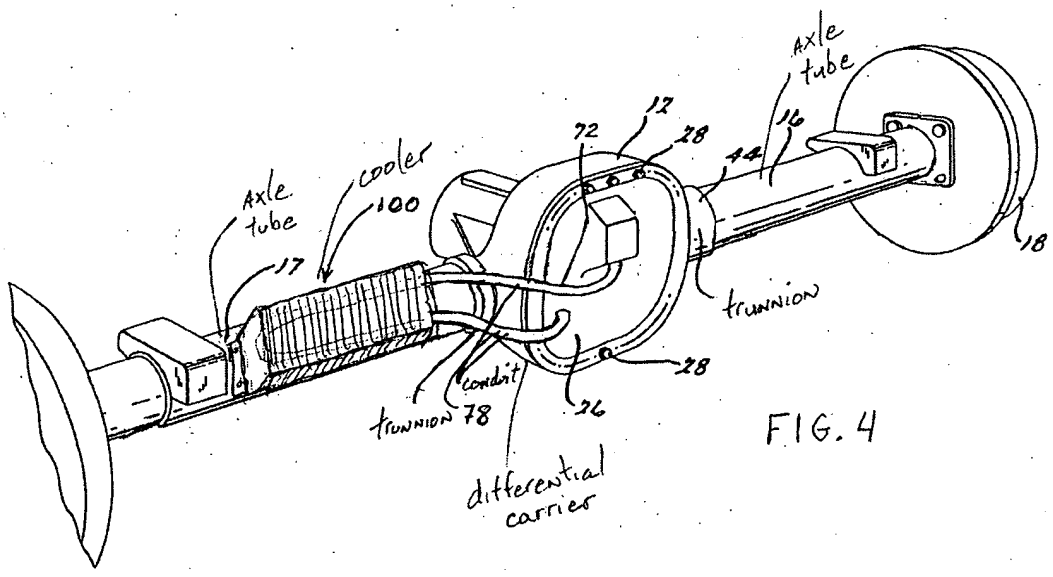


FIG. 4

(6) ISSUES

1. Whether claims 1, 3-5, 9-15, 19 and 20 are patentable over Baedke (USP 5,316,106).

2. Whether claims 16-18 are patentable over Baedke '106 in view of Gabelli '748.

(7) GROUPING OF THE CLAIMS

Claim 1, 4-5, 9 and 10 stand and fall together.

Claim 3 stands alone.

Claim 6-8 stand and fall together.

Claims 11-12, 14, 19 and 20 stand and fall together.

Claim 13 stands alone.

Claim 15 stands alone.

Claims 16-18 stand or fall together.

(8) ARGUMENTS

Sub-paragraph (i)

This sub-paragraph is not applicable to the instant appeal in so far as there are no rejections under 35 U.S.C. § 112, first paragraph.

Sub-paragraph (ii)

This sub-paragraph is not applicable to the instant appeal in so far as there are no rejections under 35 U.S.C. § 112, second paragraph.

Sub-Paragraph (iii)

Claims 1, 3-5, 9-15, 19 and 20 stand rejected under 35 U.S.C. 102(b) as being anticipated by Baedke (USP 5,316,106). It is noted that claims 1 and 11 are independent claims, claims 3-6 and 9-10 depend on claim 1, and claims 12-20 depend on claim 11.

Baedke '106 fails to disclose any type of cooler "mounted external the first axle tube" (see last line of claim 1) or any type of cooler "mounted on an adjacent axle tube" (see line 6 of claim 11).

The Examiner has improperly defined the tubular extensions or trunnions 44, 46 of Baedke '106 to be "axle tubes". The extensions 44, 46 are integrally formed as part of the carrier assembly 12. This construction is notoriously well known in the art.

The Examiner improperly defines the trunnions 44, 46 as axle tubes, but the Examiner's definition is contrary to a commonly known term of art. In automotive applications, the term "tube" "is usually narrow in relation to its length." *See* Dictionary of Automotive Engineering, 2nd Edition, Don Goodsell. Clearly, a small trunnion is not a tube. More importantly, one of skill in the art would clearly understand that the term "axle tube" refers to elements 16, 17 of the present application and elements 16, 17 of Baedke '106. Applicant respectfully submits that the Examiner is asserting a definition of axle tube that is contrary to the notoriously well known definition used by those of skill in the art.

Figure 4 of Baedke '106 is reprinted below.

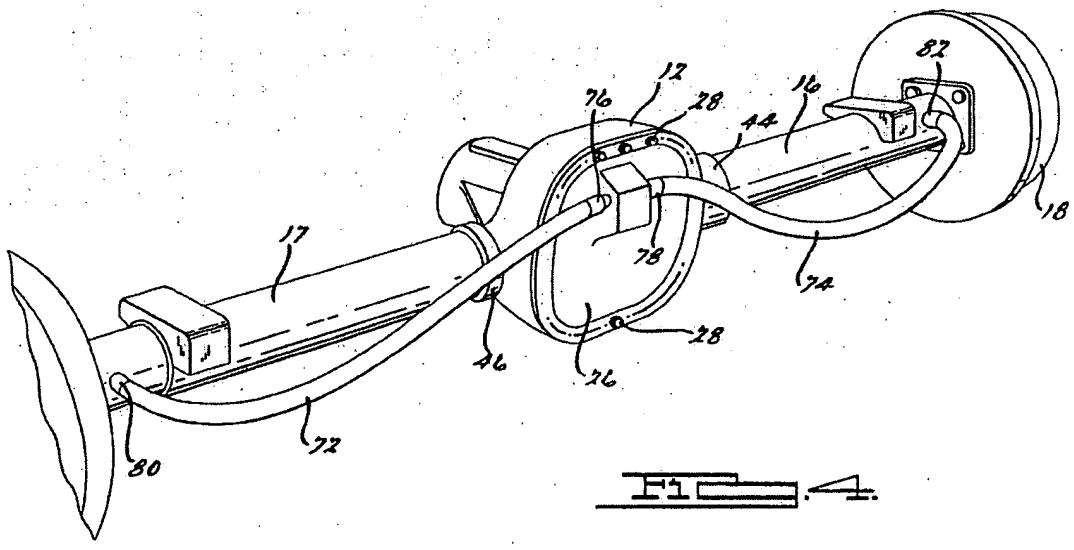


FIG. 4.

In Baedke '106, the tubular extensions (trunnions) 44, 46 "receive therein the ends of housing tubes 16 and 17, respectively." See column 3, lines 21-23. The construction of Baedke '106 is notoriously well known in the art.

It is improper to interpret the trunnions 44, 46 to be axle tubes. Axle tubes 16, 17 are specifically disclosed by Baedke '106, and it is improper for the Examiner to ignore this fact.

Pending claims 1 specifically recites a cooler that is disposed external to the at least one of the axle tubes, and pending claim 11 recites an arrangement where the cooler is mounted on an adjacent axle tube. The prior art fails to disclose or suggest such an arrangement. Baedke '106 discloses an axle tube but fails to disclose any cooler mounted on the axle tube. The trunnions 44, 46 of Baedke '106 cannot be interpreted to be "axle tubes" because such an interpretation is directly contrary to the structural definitions used by those of skill in the art. For these reasons, the current claims are allowable over the art of record.

Therefore, the rejection of claims 1, 4, 5, 9-12, 14, 19 and 20 under 35 USC §102(b) is improper.

Claim 3

Claim 3 requires a second conduit 78 having a first end hydraulically connected to the cooler 100 and a second end hydraulically connected to the cover 26, whereby the second end of the second conduit 78 is located at a third elevation lower than the first and second elevations. See lower opening 79 which is below the upper opening 69 and the cooler 100.

Since the axle tube 16, 17 and the trunnions 44, 46 of Baedke '106 are axially aligned, one portion of the internal channels defined by these elements cannot be higher or lower than another portion of the internal channels.

Claim 13

Claim 3 requires a second conduit 78 having a first end hydraulically connected to the cooler 100 and a second end hydraulically connected to the cover 26, whereby the second end of the second conduit 78 is located at a third elevation lower than the first and second elevations. See lower opening 79 which is below the upper opening 69 and the cooler 100.

Since the axle tube 16, 17 and the trunnions 44, 46 of Baedke '106 are axially aligned, one portion of the internal channels defined by these elements cannot be higher or lower than another portion of the internal channels.

Even given the Examiner's improper interpretation and definition of the "axle tubes" of Baedke '106, claim 3 is not taught by Baedke '106 because the different elevations of claim 3 are not found in Baedke '106.

Claim 15

Claims 15 depends from claim 11. Claim 11 recites "an oil cooler mounted on an adjacent axle tube". Claim 15 adds that the cooler 100 is "mounted on an exterior of an axle tube extending from said housing." Technically, the examiner's incorrect interpretation of Baedke '106 results in a structure where the axle tubes 16, 17 are mounted on the interior of the trunnions 44, 46 – not the exterior as require by claim 15.

Sub-paragraph (iv)

Claims 6-8 and 16-18 stand rejected under 35 U.S.C. 103(a) as being unpatentable over Baedke '106 in view of Gabelli '748. It is noted that claims 1 and 7 are independent claims, claims 6-8 depend on claim 1, and claims 16-18 depend on claim 11.

The Examiner asserts that it would have been obvious in view of the teaching of Gabelli '748 to provide a valve defined by claims 6-8 and 16-18 as claimed in the structure of Baedke '106. The applicant respectfully disagrees.

First, as argued above, Baedke '106 fails to disclose the cooler mounted on an axle shaft as set forth in claims 1 and 11.

Second, Gabelli '748 teaches a valve for an axle bearing – not a valve for controlling flow of lubricant to and from a cooler disposed outside a

Moreover, the Examiner fails to prove as to why one having ordinary skill in the art would have found the claimed invention to be obvious in light of the teachings of the prior art cited.

Furthermore, the Examiner's allegation is unsupported by the applied prior art and inconsistent with the disclosure of Baedke '106. Neither Gabelli '748 nor Baedke '106 suggests, nor provides any motivation to modify the "gravity" driven system of Baedke '106 with a valve as set forth in claims 6-8 and 16-18. The Examiner's assertion that these references may be modified to achieve the limitations of the present invention would clearly result from **hindsight reconstruction**, which is not permitted. There is no suggestion to support the Examiner's assertion.

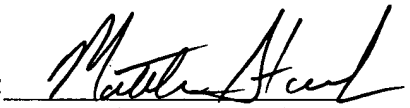
Therefore, the rejection of claims 6-18 and 16-18 under 35 USC §103(a) is improper.

Sub-paragraph (v)

This sub-paragraph is not applicable to the instant appeal in so far as the final rejection does not raise any issues other than those referred to in sub-paragraphs (i)-(iv).

In view of the foregoing, it is respectfully submitted that this application is in condition for allowance, and notice to that effect is earnestly solicited. Appellant will request an oral hearing on the merits within two months after the date of the Examiner's answer.

Respectfully submitted:
Liniak, Berenato & White

By: 
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(9) APPENDIX OF CLAIMS ON APPEAL

1. (previously amended) A system for circulating lubricant in an assembly, comprising:

a housing adapted to contain a reservoir of hydraulic lubricant;

an aperture in the housing to permit lubricant circulation;

a chamber located adjacent the aperture, adapted to hold lubricant therein, the chamber located at a first elevation;

a component supported for rotation partially in the lubricant and partially in a portion of the housing located above the lubricant, having means for moving lubricant from the reservoir to the chamber;

a lubricant cooler disposed outside of said housing; and

conduit means having a first end hydraulically connected to the chamber and a second end hydraulically connected to said cooler at a location that is distant from the reservoir and at a second elevation lower than the first elevation, for carrying lubricant from the chamber to the cooler, using gravity to transport lubricant from the first elevation to the second elevation, wherein:

the housing includes first and second axle tubes extending outward in opposite directions from the reservoir; and

the conduit means includes first and second conduits, the first conduit having a first end connected to the chamber and a second end hydraulically connected to said cooler mounted external the first axle tube of the housing.

2. (canceled).

3. (original) The system of claim 2, wherein the second conduit has a first end hydraulically connected to the cooler and a second end hydraulically connected to said housing adjacent said reservoir, the second end of the second conduit being located at a third elevation lower than the first and second elevations.

4. (original) The system of claim 1, wherein said conduit means provides a hydraulic loop from said chamber to said cooler and back to said reservoir.

5. (original) The system of claim 1, wherein the cooler is mounted on an exterior of an axle tube extending from said housing.

6. (original) The system of claim 1, further comprising a valve disposed at said chamber for controlling a flow of lubricant to said cooler.

7. (previously amended) The system of claim 6, wherein said valve is a temperature-sensitive flow control element to control flow based at least in part on the temperature of the lubricant.

8. (previously amended) The system of claim 6, wherein said valve comprises a spring member.

9. (original) The system of claim 1, wherein said component is a ring gear.

10. (original) The system of claim 1, wherein said component is an impeller fixed to a rotatable differential case.

11. (amended) A system to dissipate heat from lubricant provide within a differential carrier, said system comprising:

a differential assembly having a lubricant reservoir;

a carrier cover plate formed with an oil scrapper/pump outlet provided adjacent a rotating member of said differential assembly;

an oil cooler mounted on an adjacent axle tube; and

a delivery system to deliver lubricant from said outlet to said oil cooler and back to said reservoir,

whereby said lubricant is delivered from said carrier through said delivery system to said oil cooler via a gravity feed system.

12. (original) The system of claim 11, wherein said delivery system comprises a first conduit having a first end hydraulically connected to the outlet at a first elevation and a second end hydraulically connected to said cooler at a location that is distant from the reservoir and at a second elevation lower than the first elevation, for carrying lubricant from the chamber to the cooler, using gravity to transport lubricant from the first elevation to the second elevation.

13. (original) The system of claim 12, further comprising a second conduit having a first end hydraulically connected to the cooler and a second end hydraulically connected to said reservoir, the second end of the second conduit being located at a third elevation lower than the first and second elevations.

14. (original) The system of claim 11, wherein said oil scrapper/pump outlet forms a chamber on said cover plate, and wherein said delivery system provides a hydraulic loop from said chamber to said cooler and back to said reservoir.

15. (original) The system of claim 11, wherein the cooler is mounted on an exterior of an axle tube extending from said housing.

16. (original) The system of claim 11, further comprising a valve disposed at said oil scrapper/pump outlet for controlling a flow of lubricant to said cooler.

17. (original) The system of claim 16, wherein said valve is a temperature-sensitive flow control element to control flow based at least in part on the temperature of the lubricant.

18. (original) The system of claim 16, wherein said valve comprises a spring member.

19. (original) The system of claim 11, wherein said component is a ring gear.

20. (original) The system of claim 11, wherein said component is an impeller fixed to a rotatable differential case.